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The particular characters of the gum amidine, and other products of the fermentation of starch, are described at length in notes annexed to this paper; in one of which the author remarks, that the fixation of the elements of water, in the treatment of animal and vegetable substances by the common principles of the laboratory, occurs more frequently than is generally believed; and shows, by a comparative analysis of hog's lard in its recent state and after saponification, that the new properties which oils and fats acquire by saponification, is chiefly referable to the fixation of the elements of water.

On Corpora Lutea. By Sir Everard Home, Bart. V.P.R.S. Read January 14, 1819. [*Phil. Trans.* 1819, p. 59.]

In this paper the author describes the origin, growth, use, and decay of the Corpora lutea. The ovarium, before puberty, is a loose, open texture, in which are a number of globular cells. After puberty, the Corpus luteum forms in the substance of the ovarium. In the cow it appears, when magnified, as a mass of convolutions, somewhat like the brain. Sir Everard then proceeds to describe the drawings which accompany this paper, and of which the object is to show that the Corpora lutea are the structures in which the ova are formed; that they exist previous to, and perfectly independent of, sexual intercourse; and that, when they have fulfilled their office of forming ova, they are destroyed by absorption, whether the ova are impregnated or not.

On examining the appearance of the Corpora lutea before and after impregnation, it appears probable that impregnation is necessary for the expulsion of the ovum; but when impregnation does not take place, the ovum appears to remain in the cavity of the Corpus luteum. Hence it may be concluded, that impregnation takes place in the ovarium itself.

Remarks on the Probabilities of Error in Physical Observations, and on the Density of the Earth, considered, especially with regard to the Reduction of Experiments on the Pendulum. In a Letter to Capt. Henry Kater, F.R.S. By Thomas Young, M.D. For. Sec. R.S. Read January 21, 1819. [*Phil. Trans.* 1819, p. 70.]

In the first section of this letter, Dr. Young proceeds to examine in what manner the apparent constancy of many general results, subject to numerous causes of diversity, may be best explained; and shows that the combination of many independent causes of error, each liable to incessant fluctuation, has a natural tendency, dependent on their multiplicity and independence, to diminish the aggregate variation of their joint effect; a position illustrated by the simple case of supposing an equal large number of black and white balls to be thrown into a box, and 100 of them to be drawn out at once or in succession; when it is demonstrated that there is 1 chance in $12\frac{1}{2}$;

that exactly 50 of each kind will be drawn, and an even chance that there will not be more than 53 of either; and that it is barely possible that 100 black, or 100 white, should be drawn in succession.

From calculations contained in this paper, Dr. Young infers that the original conditions of the probability of different errors do not considerably modify the conclusions respecting the accuracy of the mean result, because their effect is comprehended in the magnitude of the mean error from which these conclusions are deduced. The author also shows that the error of the mean, on account of this limitation is never likely to be greater than six sevenths of the mean of all the errors divided by the square root of the number of observations.

The author then proceeds to the application of the doctrine of chances to matters of literature and history. He shows that with respect to the relation of two languages, nothing can be inferred from the coincidence of the sense of any single word; that the odds would be 3 to 1 against the agreement of two words; but if three were identical, it would then be more than 10 to 1 that they were derived from the same parent language. Six words give 1700 chances to 1, and eight near 100,000; so that, in these last cases, the evidence would approach certainty.

In regard to history, Dr. Young remarks, that the mention of a single number found indisputably correct may afford strong evidence of the veracity of a historian.

There is a manuscript of Diodorus Siculus, in which, describing the Egyptian funerals, he gives forty-two for the number of persons who sat in judgement on the merits of the deceased; and in a multitude of ancient rolls of papyrus, lately found in Egypt, forty-two assistants of Osiris are delineated on a similar occasion. Hence it is 100 to 1 that this manuscript is more accurate than others which have been collated; that Diodorus Siculus was a faithful historian; that the inscriptions related to some kind of judgement; and that the hieroglyphics have been truly interpreted.

The second section of Dr. Young's letter relates to the mean density of the earth.

Before we admit that the excess of density of the central parts of the earth, compared with its superficies, renders it probable that the whole was once fluid, we should inquire into the exclusive effect of pressure in augmenting the mean density. From this inquiry, Dr. Young makes it evident, that the general law, of a compression proportionate to the pressure, is amply sufficient to explain the greater density of the interior of the earth; and that this law, which is true for small pressures in all substances, and with regard to elastic fluids, in all circumstances, requires some little modification for solids and liquids, the resistance in them increasing somewhat faster than the density; for no mineral substance is light and incompressible enough to afford a sphere as large as the earth, and of the same specific gravity, without some such deviation from the general law. A sphere either of water or of air would be much denser: indeed the moon,

if perforated and containing deep cavities, would soon have absorbed her atmosphere, supposing she ever had one.

The author's letter concludes with some remarks on Euler's formula for the rolling pendulum, from which the perfect accuracy of Laplace's theorems for the length of the convertible pendulum rolling on equal cylinders may be inferred, without any limitation of their magnitude, or of the form of the pendulum. It also affords the proper correction for the arc of vibration.

On the Anomaly in the Variation of the Magnetic Needle as observed on Ship-board. By William Scoresby, jun. Esq. Communicated by the Right Hon. Sir Joseph Banks, Bart. G.C.B. P.R.S. Read February 4, 1819. [*Phil. Trans.* 1819, p. 96.]

The anomalies in magnetic observations on ship-board were usually attributed to imperfections of the azimuth compass, till Capt. Flinders suggested the influence of the iron used in the construction of the ship as their probable source,—a suggestion since confirmed and illustrated by Mr. Bain.

In this paper, Mr. Scoresby has given a table of the selected results of his observations relating to this subject, conducted on the coast of Spitzbergen, in the years 1815 and 1817. To these he has added some general inferences, deduced at the time of observation, and observes, that the anomaly of attraction is probably the greatest in men-of-war, and ships containing large quantities of iron, though it also exists to a considerable extent in merchantmen where iron forms no part of the cargo, especially in high latitudes where the dip of the needle is great.

On the Genus Ocythoë; being an Extract of a Letter from Thomas Say, Esq. of Philadelphia, to William Elford Leach, M.D. F.R.S. Read February 4, 1819. [*Phil. Trans.* 1819, p. 107.]

After describing a genus of Ocythoë, which the author regards as new, he observes that the Ocythoë offers a deviation from the ordinary laws which apply to the testaceous Mollusca, inasmuch as it resides only in the last volution of the shell; and as the shell does not fit the body, it appears probable that it was not made for it, more especially as there is no attachment between the shell and any part of the body. The shells that approach nearest to Argonauta are of that order: this supposition, however, is not corroborated by the habits of the animal; for all hitherto discovered of that order swim to the surface; and having no other organs of locomotion than fins, cannot glide upon the bottom. We must, therefore, suppose this to have been the habit of the animal; and yet it is hardly admissible that in that case it should have eluded the observation of voyagers, when the shell has often been found occupied by the parasite.